

**What Is Chemistry?**

**Why is the scope of chemistry so vast?**

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**Matter** is anything that has mass and occupies space.

**Chemistry** is the study of the composition of matter and the changes that matter undergoes.

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**Because living and nonliving things are made of matter, chemistry affects all aspects of life and most natural events.**

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**Areas of Study**

**What are five traditional areas of study in chemistry?**

**Five traditional areas of study are**

- organic chemistry
- inorganic chemistry
- biochemistry
- analytical chemistry
- physical chemistry

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**Organic chemistry** is defined as the study of all chemicals containing carbon.

**Inorganic chemistry** is the study of chemicals that, in general, do not contain carbon.

**Biochemistry** is the study of processes that take place in organisms.

**Analytical chemistry** is the area of study that focuses on the composition of matter.

**Physical chemistry** is the area that deals with the mechanism, the rate, and the energy transfer that occurs when matter undergoes a change.

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**Worksheet**

- $6.6 \times 10^9 \text{ cm}$  ✓
- $3.4 \times 10^{1/3} \text{ mm}$   $3.4 \times 10^1 \text{ hm} \times 10^2 \text{ m} \times 10^3 \text{ mm}$
- $2.2 \times 10^{18} \mu\text{g}$
- $3.7 \times 10^{13} \text{ nmol}$   $8.25 \times 10^{-21} \text{ hm} \times 1 \text{ m}$
- $1.6 \times 10^3 \text{ Mmol}$   $8.94 \times 10^1 \text{ c} \times 10^1 \text{ L}$
- $89.4 \text{ cm m}$
- $8.125 \times 10^{-41} \text{ kL}$

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**Solids**

A solid is a form of matter that has a definite shape and volume.

**2.1 Properties of Matter > States of Matter**

**Liquid**

A liquid is a form of matter that has an indefinite shape, flows, yet has a fixed volume.

**2.1 Properties of Matter > States of Matter**

**Gases**

A gas is a form of matter that takes both the shape and volume of its container.



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**2.1 Properties of Matter > Physical Changes**

During a physical change, some properties of a material change, but the composition of the material does not change.

As gallium melts in a person's hand, the shape of the sample changes, but the composition of the material does not change.

Physical changes can be classified as **reversible** or **irreversible**.

- All physical changes that involve a change from one state to another are reversible.
- Cutting hair, filling nails, and cracking an egg are examples of irreversible physical changes.



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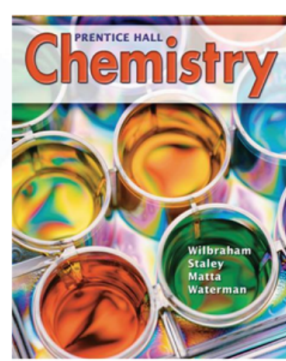
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PRENTICE HALL

**Chemistry**

P 55  
28 to 34  
Review  
P 42  
1 to 8  
P 87(top)  
2all

Wilbraham  
Staley  
Matta  
Waterman



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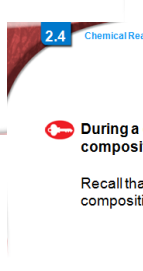
**Chemical Changes**

What always happens during a chemical change?

**2.4 Chemical Reactions > Chemical Changes**

During a chemical change, the **composition of matter always changes**.


Recall that during a physical change, the composition of matter never changes.



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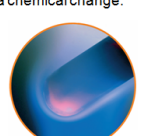
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A magnet separates iron from sulfur. This is an example of a physical change.



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A mixture of iron and sulfur is heated. The iron and sulfur react and form iron sulfide. This is an example of a chemical change.

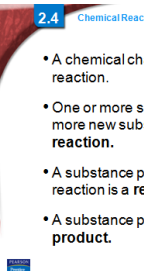


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**2.4 Chemical Reactions > Chemical Changes**

- A chemical change is also called a **chemical reaction**.
- One or more substances change into one or more new substances during a **chemical reaction**.
- A substance present at the start of the reaction is a **reactant**.
- A substance produced in the reaction is a **product**.



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**What are four possible clues that a chemical change has taken place?**

<http://sanfordchemistry.wikispaces.com/>



- Possible clues to chemical change include:

- a transfer of energy
- a change in color
- the production of a gas
- the formation of a precipitate.

2.4


A **precipitate** is a solid that forms and settles out of a liquid mixture.

Clues to chemical changes have practical applications.




2.4

## Conservation of Mass

 **How are the mass of the reactants and the mass of the products in a chemical reaction related?**

2.4

 During any chemical reaction, the mass of the products is always equal to the mass of the reactants.

2.4

The **law of conservation of mass** states that in any physical change or chemical reaction, mass is conserved.

The conservation of mass is easily observed when a change occurs in a closed container.

